Corporate Security Enhancement Program
CCTV Camera System – General Specification

Revision 2 – 11 Dec 2002

1. General

1.1 Scope

The following specification establishes requirements for a fixed CCTV camera system that allows for continuous monitoring and recording of each designated point of vehicle, railroad or pedestrian ingress. Pan-tilt-zoom cameras shall not be substituted for fixed cameras in these locations.

Mandatory requirements are noted by use of the verb "shall".

1.2 References

Attachment I of the Project Objective Letter dated August 8, 2002

1.3 Equipment and Vendor

Sites shall use the specific equipment identified in this specification unless there is an existing CCTV system that can be expanded "in kind" to provide functionality that is comparable to the CCTV system specifications for this program.

An authorized Panasonic dealer shall install all CCTV components or systems purchased under the program unless an existing non-Panasonic system with comparable functionality is being expanded.

2. Basic System Description & Considerations

2.1 Front-End

2.1.1 Front-end Equipment

The front end of a CCTV system commonly consists of the camera monitors, recording device(s), transmission cables, supporting cables, racks, and consoles. The front end also includes a connection integrated into the recording device that can be used to connect to site Ethernet/intranet.

2.1.2 Location

CCTV equipment shall be installed in an area where it can be monitored 24/7. If this is not possible, other alternatives for recording and viewing shall be provided. Equipment shall be installed in a way that considers ergonomics, effective lighting, glare on monitors, and operational layout.

2.1.3 Electrical power for front-end

Power to front-end (fiber electronics, digital recorder & CCTV monitors) shall be supplied from an uninterruptible power-supply (UPS). Existing back-up power generation may allow for a smaller UPS.

2.1.4 Digital video recorder

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Digital video recorders shall be **Panasonic model WJ-HD500AV**: 16 camera capable, digital surveillance recorder equipped with a hard disk drive(s) allows simultaneous recording, live monitoring, image search and playback with interrupting recording, flexible size and expandable in size on an add-on basis.

Features include:

- Programming features through front-of-panel controls
- High quality images by digital recording
- Built-in 80GB hard drive (80GB additional can be added for 160GB in one unit)

  For the Corporate Security Enhancement Program, the hard drive shall be sized for recording on detected motion.

  The memory in the digital video recorder shall be sized for 30 calendar days of video from all connected cameras before over-write.

- Up to 2,080GB expansion method with optional expansion units **Model HDE 500** (number of expansion units & drive bays is dependent on system size)
- RAID level 1 (mirroring) for reliability
- 4 (four) way JPEG compression recording modes selectable (Extended / **Normal** / Fine / Super Fine)
- 720H x 480V (frame), 720H x 240V (field) pixels selectable
- Built-in 16 channel multiplex recording system (Triplex mode – Live/Recording / Playback)
- 100 Base-T network Interface capability included.
- 3D scan conversion for stable freeze frame picture
- Four programs / 5 timer schedules per recorder
- Recording modes; 1 shot rec. / multi-shot rec. / time lapse rec.
- Quick search function (thumbnail / alarm list / direct mode)
- Motion detector function included.
- Optional remote controller; WV-CU50 is available for easy operation.
- 120 VAC power, 58 watt consumption
- Alarm outputs

2.1.5 Monitors

Monitors shall be **Panasonic WV-CM2080** (or equivalent) configured for Quad Mode (4 camera images per monitor) continuous display for dedicated viewing of each camera that is a point of plant ingress.

Features include:

- 20"color CCTV monitor
- 51 cm (20") diagonal visual size
- Looping through BNC connectors for video input and output
- 120 VAC, 90 watts power consumption

To satisfy the quad mode continuous view requirement the video signals from the cameras are looped through Quad Units to the digital video recorder. Each Quad Unit takes up to four video signals and produces a quad display (2X2 matrix) for a monitor. The Quad Unit shall be **Panasonic WJ-MS424.** A Quad Unit and a 20 inch monitor will be required for every four cameras that monitor points of plant

- Two ATW settings for different light sources (Normal or Sodium lighting)
- Switches to B/W mode, automatically or manually
- Built-in motion detection for system integration
- Standard 24 VAC operation
- Lens included (2X variable focus / 3.8 – 8.0 mm)

2.2.3 Premium (low-light) box-type camera

For most applications, the standard box-type camera shall be used. In certain special situations where natural or artificial lighting is extremely low, a premium (low light) box-type camera may be required.

Premium (low-light) box-type cameras shall be **Panasonic WV-CL920 Series Ultra Low Level Color Camera.**

Features include:

- 1/2-type interline transfer CCD w/infrared sensitivity
- Super dynamic II camera to produce exceptional images even in high contrast situations
- Day/Night operation provides optional images depending on lighting condition
- 480 TV horizontal lines color resolution: 570 TV lines B/W resolution
- Super sensitivity of 0.3 lux (0.03 fc) at F1.4 in color mode and 0.02lux (0.002fc) at F1.4 in B/W mode
- Electronic shutter from 1/60 to 1/10,000 sec.
- Two ATW settings for different light sources (Normal or Sodium lighting)
- Automatically switches to B/W mode for night surveillance
- Built-in motion detection for system integration
- For 24 VAC operation with line lock specify **Panasonic Model WV-CL924**
- Requires lens (default lens - **Panasonic Model WV-LA36** for 36 mm Telephoto Auto Iris Lens; confirm during design)

2.2.4 Outdoor camera enclosures – box type camera

Box-type camera enclosures shall be **Panasonic Model POH1000HB** (Model POH-100 with factory installed 24 VAC heater and fan).

Features include:

- Requires local 24 VAC power supply
- Requires supporting bracket or assembly (such as corner, pole, parapet bracket)
- Consider optional sunshield model PSS10

2.2.5 Electrical power for cameras

UPS power is not required at cameras, but power should be from a reliable power source.

TVSS and/or lightning protection should be provided at local camera/electronics.

2.2.6 Lighting

The design basis is based on providing either natural or artificial light for the camera viewing area. The premium (low light) box camera referenced in Section 2.2 should be considered before proceeding with installing additional artificial light.

Ideally, light sources should be heavy in the daylight/white light spectrum; some light sources may require "whiteboard" color calibration for best color rendition. Low-pressure sodium is not recommended.

Light placement and selection of light source should generally be pointed (aimed) at area to be viewed to eliminate "flare" or "hot spots" in the viewed image.

For lighting, normal power from lighting/power panels is considered acceptable (UPS power not required).

2.2.7 Camera supporting infrastructure

Infrastructure to support cameras commonly includes a locally mounted NEMA 4 (or other) enclosure to house communication electronics, camera / electronic power supplies, incoming 120Vac power, camera to backbone connections, etc. The enclosure should be located inside plant fence-line and include hardware to provide for padlocking/non-tamper seal to control/verify unauthorized access.

2.3 Video Communications Equipment

2.3.1 Front-end electronics

The card chassis shall be **Optelecom Model 9002:** Rack mount card chassis for standard 19" EIA mounting systems, with 21 slots capable of holding up to 2 power suppliers with space for 15 single slot cards. The chassis shall permit the installation or removal of other cards with power applied without affecting other cards in the chassis.

The power supply shall be **Optelecom Model 9030** (or 9050 depending on current demand of installed cards): Rack mounted power supply to provide 6 VDC at up to 14 Amps (24 Amps for 9050) with IEC front plug for 120 VAC input. Units shall have indicators for voltage 6.4 Volts, 6 volts and voltage/current out-of-limits, and contact closure for voltage out-of-limits. The unit shall have adjustment for voltage trimming and a connection for output current measurement.

2.3.2 For fixed camera, one camera per fiber application using FM (analog) video over fiber

The receiver at the front-end shall be **Optelecom Model 9111RRR-L-ST:** Rack mounted receiver for three simplex (one direction) video signals transmitted over three separate multimode (62.5/125 μm) fibers using PFM (pulse frequency modulation) transmission. Each card shall be provided (standard) with "video present" indicators for each channel and "ST" type connectors located on the front face. Optical Budget is 17 dB at wavelength of 1310 nm to provide a useable range of 9 km (5.6 mile).

The transmitter at the camera shall be **Optelecom Model 9113T-L-ST:** Video modem for transmitting one simplex (one direction) video signal over one fiber using PFM (pulse frequency modulation) transmission . The unit shall operate with 75 Ω, 1 V p-p NTSC, PAL, or SECAM video signals and support a video bandwidth of 2 HZ to 10 MHz with an SNR of –60 dB weighted per

RS250C standards. The unit shall operate with multimode fiber at a minimum link budget of 18 dB at a wavelength of 1310 nm with an effective range of 10 km (6.2 miles). The Model 9113T requires an **Optelecom 9015PS** - 12 VDC power supply (120 VAC to 12 VDC @ 500 ma power supply) at camera.

Note: Selection of above Optelecom transmitter/receiver using simplex PFM transmission requires camera setup at the camera location. Camera setup from front-end is only possible with systems using transmitters/receivers with video and "up the coax" data transmission and associated digital multiplexers, remote controllers.

2.3.3 For fixed camera, four cameras (channels) per fiber application using digital video over fiber

The receiver at the front-end shall be **Optelecom Model 9131DR-L-ST:** Rack mounted receiver for four (4) simplex (one direction) digital video signals transmitted over one (62.5/125 μm) fiber. Each card shall be provided (standard) with "ST" type connectors located on the front face. Optical Budget is 17 dB at wavelength of 1310 nm to provide a useable range of 1.8 km (1.1 mile).

The multiplexer at the camera shall be **Optelecom Model 9131DT-LD-ST:** Rack mounted multiplexer for transmitting four (4) independent simplex (one direction) digital video signals over one fiber. The unit shall operate with 75 Ω, 1 V p-p NTSC, PAL, or SECAM video signals and support a video bandwidth of 6.5 MHz @ -3 dB. The unit shall operate with multimode fiber at a minimum link budget of 17 dB at a wavelength of 1310 nm with an effective range of 1.8 km (1.1 miles). This multiplexer requires Model 9003-2 two-slot chassis for stand-alone operation. The model 9003-2 rack requires Model 9010 power supply (120 VAC to 6 VDC) and should be mounted in NEMA 4 enclosure housing at camera(s) location.

2.3.4 For fixed camera and remote control of gate operator. One video camera and three data channels per fiber application using digital video over fiber.

The receiver at the front-end shall be **Optelecom Model 9211DR(C)/MM-ST-0813:** Rack mounted receiver for one simplex (one direction) digital video signal and three contact closure data channels transmitted over multimode (62.5/125 μm) fiber. Each card shall be provided (standard) with "synch" and "loop established" indicators and "ST" type connectors located on the front face. Optical Budget is 8 dB at wavelength of 1310 nm to provide a useable range of approximately 3 km (1.8 mile).

The transmitter at the camera shall be **Optelecom Model 9211DT(C)/MM-ST-0813:** Rack mounted video modem for transmitting one simplex (one direction) digital video signal and three contact closure data channels transmitted over one fiber. The unit shall operate with 75 Ω, 1 V p-p NTSC, PAL, or SECAM video signals and support a video bandwidth of 6.5 MHZ to 10 MHz @ -3 dB, >67 dB SNR over entire optical range. Optical Budget is 8 dB at wavelength of 1310 nm to provide a useable range of approximately 3 km (1.8 mile). This model 9211DT transmitter requires a Model 9003-2 two-slot chassis for stand-alone operation. The model 9003-2 rack requires Model 9010 power supply (120 VAC to 6 VDC) and should be mounted in NEMA 4 enclosure housing at camera(s) location.

Note: 5 km (3.1 mile) receiver and transmitter models are available

2.4 Video Transmission Infrastructure

Video transmission methods include fiber optic, coaxial cable, and unshielded twisted-pair cable (UTP) and wireless.

Fiber optic cable is preferred. Coaxial cable may be appropriate for indoor or short-run, protected outdoor applications.

In unique applications where very long cable runs are impractical or costly, UTP or wireless may be appropriate.

Generally FM (analog) is preferred for simplex transmission for fixed cameras using one camera per fiber.

Digital transmission is used for duplex communication, for pan-tilt-zoom (PTZ), and for multiple cameras using one fiber applications. Options such as simplex/duplex transmission of data, contact closure, multiple camera, signal multiplexing, or other long term extended use of the system is possible.

All of these methods have length/signal loss limitations that must be addressed as part of the specific system specification.

2.4.1 Fiber-optic cable

The communication (signal transmission) infrastructure is the most subjective component of the overall installation and can represent the most significant cost segment. The basic fiber-optic network may be existing and may share communications systems including site Ethernet backbone. The installation will likely be outdoors but may be overhead on poles or other structures or underground. New overhead installations or extensions may require new poles. If fiber-optic cable is not self-supporting, new messenger cables and lashing of the fiber cable to the messenger will be required. At each end of the fiber cable, breakout boxes may be required and connectors or splices made.

Fiber-optic cables for outdoor use should be multi-mode (62.5/125 μm), gel-filled, loose tube construction.

Cables are available with 2, 4, 6, 12, 24 and greater fibers based on immediate need and planned future use.

Fiber-optic cables shall be installed per the National Electric Code® – Article 770

2.4.2 Typical fiber-optic cable – supporting installation hardware

- Wood Pole or supporting steel structures
- Messenger wire and connecting hardware
- Lashing wire and lashing of the fiber-optic cable to messenger
- Fiber optic breakout boxes (commonly 12 port) are required to change from outdoor to indoor fiber cable sets.
- Fiber-optic spider and buffer-tube fan-out kits
- NEMA 4 enclosure at camera end for breakout, possible mounting of transmitters/receivers, and possible location of camera and communication electronics power suppliers.
- Type ST connectors and connection preparation
- Indoor fiber-optic jumper assemblies
- Interior building fiber-optic channel or raceway.

- Misc. consumables
- Safety-signs on fiber-optic cables. Appropriate caution signs are required by code to identify fiber transmission as a personnel hazard.
- Final testing and documentation

2.4.3 Typical coaxial cable requirements for indoor/ short-length outdoor applications

Coaxial cable is recommended for applications where the cameras are in or near the front-end equipment. Where dome-type cameras are used in interior building applications, RG-59U coaxial cable will be the likely choice with an expected short distance to the front-end electronics or fiber-optic transducers.

3. Installation Contract Considerations & Basic Design Requirements

State:

- Site minimum ambient temperature
- Site maximum design temperature
- Site humidity
- Basis wind or other site conditions (wind/storm/ice-loading, etc.)
- Environmental considerations (affecting the choice of aluminum, fiberglass, glass, Lexan, such as excessive dust, salt-air/marine, etc.)
- That outdoor mounted components in NEMA 4 or IP66 enclosures shall meet design condition of site maximum ambient, in full sun with no wind without the use of fans.

Resolve responsibility for:

- Providing an understanding of how the system will be used, and location of equipment.
- Basic system calculations including camera record interval, camera record rate, and digital recorder hard drive capacity
- Setup and commissioning the video system (cameras, digital recorders, and monitors)
- Final camera selection and location
- Fiber-optic system setup (electronics), testing and documentation requirements.
- Completing optical budget analysis of the fiber-optic system.
- Basic system engineering including maximum length of fiber/copper for video transmitters & receivers.
- What training is required, who will provide and how will be trained.

4. Safety & Maintenance Considerations

The following should be considered:

4.1 Electrical Considerations

Where 120 VAC is present, all equipment, wiring, and terminals shall control the hazardous voltage through the use of touch-safe terminals, encapsulation, or other approved method, voltage shall be marked and/or readily recognizable from lower voltages. Plugs and plug strips are preferred over permanent wiring. Under no circumstances are exposed surfaces of hazardous voltages (greater than 50 volts) acceptable.

Voltage at cameras shall be 24 VAC unless approved otherwise.